

# Monthly Indicators Reporting System for the National Information Center for Health and Population

*July 1998*

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Partnerships  
for Health  
Reform



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Partnerships  
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**July 1998**

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# Abstract

This report provides an assessment of feasibility for a monthly reporting system of key indicators produced from the data now gathered by the National Information Center for Health and Population (NICHHP). The general problem to be addressed by such a system is that extraordinary data resources are being compiled within the NICHHP, reported monthly from the governorates. Yet, not much data or information flows from NICHHP to policy makers and technical staff within the Ministry of Health and Population (MOHP).

Among the tactics for improving information flow to users is the concept of an Executive Information System (EIS) within the MOHP executive offices. Would it be feasible to use current data resources within the NICHHP to create a monthly (or periodic) report on indicators of health care system performance, which could be communicated via such an EIS? This was the question for the technical assistance visit in late May 1998. The report concludes such indicators are feasible to be created from available NICHHP data and staff resources.

Data now being collected by the NICHHP was examined for quality and completeness. A set of ideal indicators was developed for NICHHP. A phased plan for creating indicators from readily available data is also proposed here.

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# Acronyms

<b>ALOS</b>	Average Length of Stay
<b>BTS</b>	Budget Tracking System
<b>DDM</b>	Data for Decision Making
<b>DRG</b>	Diagnosis Related Group
<b>EIS</b>	Executive Information System
<b>HIC</b>	Health Information Center
<b>HIS</b>	Health Information System
<b>MCH</b>	Maternal Child Health
<b>MIS</b>	Management Information System
<b>MOHP</b>	Ministry of Health and Population
<b>NICHP</b>	National Information Center for Health and Population
<b>PHR</b>	Partnerships for Health Reform
<b>USAID</b>	United States Agency for International Development



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# Acknowledgments

This report was produced with valuable assistance and insight from Brad Atkinson and Bhavya Lal, both from Abt Associates Inc. The formative guidance of PHR long-term advisor Les Fishbein was instrumental in seeing the need for this work and for providing context and logistical support during the TDY when the work was done. Excellent technical support was also provided by NICHHP statistician Dr. Sohier Saad Botrous. Dr. Tayseer El Sawy, Director General of the NICHHP, was particularly helpful in providing access to resources and technical guidance for the design of the illustrative indicator measurement system.



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# Executive Summary

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## Plan for an Indicator Reporting System for the MOHP

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The objective of this report is to describe a concept and related options for a monthly reporting system composed of performance indicators of the programs and activities of the Ministry of Health and Population in Egypt (MOHP). A second objective is to convey recommendations for the implementation process of such a program of indicators, for which a pilot plan is to begin immediately that might lead to monthly indicator reporting by the end of August 1998.

This work is based on a situation assessment done May 17–June 4, 1998 for long term health information system (HIS) advisor to the minister, Les Fishbein. Authors of the report are consultants Gary Gaumer, Brad Atkinson and Bhavya Lal. Reports prepared for earlier consultant work for PHR work in Egypt on Management Information Systems (MIS), Executive Information System (EIS) technology options by Gordon Cressman, work on indicators by Vahe Kazandjian (for Nadwa Rafeh), and work on Egyptian health MIS and indicator development by Luigi Jaramillo were reviewed. Visits to observe data gathering and analysis activities were made to the Governorate Health Information Center (HIC) in Alexandria, to two health clinics (in the Montazah district of Alexandria), and the HIC of the Maternal and Child Health (MCH) Project. Extensive observation, data extract requesting, and interviewing were conducted daily in the National Information Center for Health and Population (NICHP) with the expert assistance of Dr. Sohier Saad Botrous. Guidance and support of NICHP Director General Dr. Tayseer El Sawy has been particularly helpful in designing this indicator measurement system.

The concept being proposed is a monthly, computerized set of fixed graphical and tabular images of aggregated measures and related benchmarks using data already being reported monthly to the MOHP about public health and the health care delivery system operated by the MOHP. The number of indicators would be increased over a two-year phase-in period. Phasing is required because of data quality issues and the need to develop staff skills.

While there appear to be some serious data quality issues, the extent of the problems is difficult to assess. For this reason, and the uncertainty about staff capabilities to produce and sustain a monthly production channel, the recommendations include the immediate creation of a small and dedicated technical unit (three or four persons) in the NICHP to be charged with the creation of January indicator charts and tables and a companion technical memo enumerating data quality issues. This demonstration would be aimed at providing information for a decision to proceed with data release (during July) and to set expectations in motion about monthly indicator production. Prior to release of data a decision would need to be made about platform. The PHR research team identifies some options here, but considers this issue to be subject to broader influences of MIS design. Absent those broader concerns, PHR would recommend the use of an intranet/internet platform in order to tie (eventually) all the indicator system activities of data transmission and distribution to the same communication platform.

This report includes a description of the objectives and current situation as it relates to the ability of the NICHP to produce performance indicators for the top executives in the MOHP. The report offers a recommendation of the specific indicators that might compose such a system using current

data available to the NHIC, offers recommendations about the approach to technology for delivering such indicators in the initial implementation, and recommends an implementation approach. The report is appended with a short paper on indicator development for health reform interventions (Annex C). This paper offers some criteria and issues about indicator system selection, which have guided the indicator recommendation made here.

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# 1. Objectives

The Minister of Health, His Excellency Professor Ismail Sallam, has complained about an unmet need of routine information from the data capture systems of the National Information Center for Health and Population (NICHP). These data capture systems are described and assessed more fully in a companion report (Gaumer, 1998) but are primarily composed of facility, clinic, and health department aggregated data on service utilization, vital events, and volumes of various health activities. The data are kept in monthly form in data base files (FoxPro and ACCESS). In the past, the NICHP has used the data only for reports to the sectors of the Ministry of Health and Population (MOHP) (Curative, Primary, and Population) and for special studies.

The objectives of an indicator reporting system for top managers in the MOHP are to:

help top managers quickly identify emerging management and policy issues that may need attention;  
provide routine and easy access to compelling and important information; and  
permit user-directed access to more detailed information or direct communication to others who may provide such details.

The indicators themselves need to be summary measures of program or policy performance. To achieve the objectives, the measures themselves need to be:

aggregated performance data, presented graphically;  
shown with comparative, or benchmark information to aid in visualizing trends or important differences;  
supported by backup details on exceptions and outliers;  
selected from among all possible indicators because the measure is sensitive (responsive) to changes in program/policy performance; and  
selected from among all possible indicators because the measure is routinely gathered in a consistent fashion and is of comparable reliability over time and across all jurisdictions of the MOHP.

In addition to the specific design of measures, the indicator concept recommended is:

callable from a computer on the executives desk;

monthly refreshed with new data; (with scheduled supplements for data like expenditures, DHS results, Quality of Care indicators, other maternal and child health (MCH) indicators, etc. These scheduled and annually refreshed supplements would come from data sources only available on an annual basis or other data from special project indicator systems.) must be a work product of the NICHP staff; and

must not release the first issue until sustainability is evident.



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## 2. Issues

Based upon the review of data captured monthly and maintained within the MOHP, there are issues which prohibit a direct and quick implementation of a full, monthly reporting system of indicators that might meet these objectives. These issues are summarized here and described in more detail in the data assessment report. In spite of these issues, a phased approach to national indicator reporting can begin soon.

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### 2.1 Data Consistency and Reliability (Standardization) Is Not As Good As It Should Be

The flows of data are not the same in all governorates, and data automation is not uniformly practiced by the health information centers (HIC) in the governorates. While there is a standard data dictionary available in all sites, errors are common in some fields, and (based upon the experience highlighted below) there appears to be no successful process of verification of questionable data received by the NICHP. (For further information on data quality, see Gaumer, 1998.)

To examine data quality, summary spreadsheets on urban hospital data, rural facility data, and vital events, such as births and deaths, were requested for FY1997 and for each of the last three months of that year. These data were selected to “test” the ability of extant data sources to support preparation of prototypical data displays that might be part of the indicator system. These data, in somewhat different forms, were requested from three sources: (1) the NICHP, (2) the similar data held in a unit level data base by the HIC of the Maternal and Child project (the health information system [HIS]), and (3) the Alexandria HIC (probably the best equipped and skilled HIC of all the 27 governorates). The results of this request were reported as follows:

The Excel spreadsheets were delivered in an English version from the NICHP without evidence of difficulty for Forms 1 and 7.

The similar request from the MCH/HIS office was not able to be generated due to high levels of missing unit level data (facility, clinic, and office).

While vital event data seems to be complete and available to the NICHP within a month or so, subject to the caveat that even after six months some items are not consistently complete or reported consistently), the hospital utilization measures are still incompletely reported through five to six months.

Missing values were reported as zero throughout the data received, apparently as a result of requirements of the HIS data base software.

Maternal mortality data seems very inconsistently reported (likely a problem with cause of death data for women in general—e.g., postpartum deaths of new mothers may be reported as heart failure or pneumonia and not reported as a consequence of childbirth).

In the aggregate, dead births are occurring at rate far lower than in urban areas—clearly a product of missing data in many areas. Failure to report stillborn births is a second but smaller problem here (failure to record the birth, failure to report the death).

Occupancy rates, particularly in rural facilities, cannot be computed due to obvious and common errors and inconsistencies in counting beds and days. “Days” are widely perceived as a reporting issue due to inconsistent understanding of unit staff of the definition in the codebook (in spite of training). “Bed” values are routinely taken from a special facility file and not taken from forms. The data request for this report obviously did not follow this rule.

Data requests were also made for annual values (for 1997) for the district of Montazah and the Governorate of Alexandria for each of the indicators described below, which range across the entire set of indicator candidates (e.g., public health, curative, primary care, vital statistics, etc.).

The request of the NICHP and HIS staffs has not yielded this data as yet.

In summary, the data being held within the NICHP is being gathered and automated. But, it is often inconsistently and incompletely reported, and the treatment of missing values makes separation of these two data problems impossible to assess by inspection of the data. The quality of the data held by NICHP certainly appears much better for vital events than for hospital and clinic statistics. The MCH data also seems much better than the other, probably owing directly to the considerable effort by the MCH project to standardize data reporting and to automate data captured at the governorate level.

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## **2.2 A MIS Platform for the Indicators Is Not Readily Available**

The system of indicators is not an Executive Information System (EIS). The EIS seems, at least in concept, to be composed of four quite distinct parts:

a set of indicators and analytic displays of those data;

software to allow access to basic indicators and to guide users to more detailed information (via drill down or other functionality);

a platform for delivering indicators and other data to managers; and

a set of executive action support tools (like e-mail, scheduler, etc.).

### **2.2.1 Hardware**

The indicators could be delivered via hard copy, a proprietary application on a network or intranet, or simply some spreadsheet/Powerpoint products delivered via diskette, network or internet. At this time there is no network nor functioning web site or internet access. Potential users have primitive computer capabilities. At this point, a decision regarding the technology used for the indicator system needs to be made soon in order not to imperil the proposed schedule.

### **2.2.2 Software**

Two important, related choices for functionality seem important:

linkage between views or drill down capability, and

work/knowledge required of the user to extract information and inferences.

Basically, more user-specified functionality will require more time and more training of the user. Given the primitive state of computerization within the MOHP and the dearth of home computing, it seems risky and unnecessary to give functionality to users that will raise training requirements and elevate risks of frustration and non-use. This generally leads to the recommendation to produce fixed views of indicators (rather than afford users flexibility to create their own charts and graphs) and to allow toggling to more detailed, supplemental data displays from the basic views (to allow access to these additional data as an exception).

The Budget Tracking System (BTS) developed by the Data for Decision making (DDM) project (for displaying expenditure allocations across sectors and function) is certainly an option. The review (Gaumer, 1998) suggests that there are two problems with the BTS software for the initial implementation if the indicator system (say, in the next six months). First, the software would need to be substantially modified to hold the expanded data set and to create the necessary tables and charts for display. Second, the BTS will require the user to be proactive in viewing and working with the data—something that may frustrate some users.

A more detailed assessment of the BTS system is in Annex A.

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## **2.3 Skills and Data Systems for Sustained, Monthly Production of Charts, Graphs, and Tables May Not Exist at This Time in the NICHP**

If a monthly indicator system is put in place, the level of expectations will be high for it to continue to produce updates in a timely fashion. If data quality were not an issue, this would be less risky because the production process could be highly routinized. But, there are such issues, and they will continue to plague the production cycle of indicator data. It is not clear what staff depth exists in the NICHP for appraising the data for quality issues. It is also not clear what mechanisms are available for resolving issues and retrieving replacement data other than relying on governorate HICs to use whatever tools are available to them to comply.



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## 3. Indicators

At the heart of the indicator system are measures of performance. These measures must be compelling (e.g., related to important aspects of performance or focus of the MOHP programs and policies), and they must be sensitive to changes in performance (e.g., they must change values when performance gets better or worse). They must also be defined for data that can be reliably and consistently obtained monthly by existing data capture sources available to the Ministry and NICHP.

The PHR research team has reviewed the existing data and data handling flows and structures of the NICHP and identified a number of measures that seem to meet these criteria. The chart in Annex B (available in hard copy from the PHR Resource Center) describes these indicators and the sequence (1,2,3) of preferred implementation.

PHR has tried to make recommendations for indicators in Phase One that would represent each of a number of important sectors of health and health care (public health, vital population data, and curative).

Why were these particular indicators selected? In part, they represent the key measures to be drawn from the monthly data now being captured by the NICHP. Several other indicators, which may be adopted in the future (Phases Two and Three), were added based upon a review of a workshop report on indicators (Jaramillo, 1997) written for the MOHP. Discussions with MCH/HIS staff and NICHP staff were also helpful in identifying items that may not be reliable and that may require some changes to the data being requested in order to be useful.

Two types of non-traditional indicators are included here:

Monthly summary report information on major donor funded projects supported by the MOHP. Items to be reported are illustrative. The idea is to allow the MOHP executives to see what is happening on the major projects on a routine basis and in some standard fashion across projects. This will be viewed as a reporting burden for the projects.

Monthly indicators (to be developed) on major reform initiatives of the MOHP. The other indicators shown here are “routine” ones and not necessarily well targeted to particular initiatives that may be important. While transient, the progress and performance of special initiatives could (and should) be tracked on the indicator system. To do so would require indicators be developed and data capture methods to be implemented. Ideally, process and intermediate outcomes would be used as indicators, following the ideas and methods (policy modeling) suggested in Annex C.



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## 4. Presentation of Indicator Data

The selected indicators must be presented on the information system (e.g., the Executive Information System [EIS] software) in an informative and interesting fashion. Raw data is not of high enough value to occupy the time of executives. Designs in Annex D (available only in hard copy from the PHR Resource Center) illustrate how to display indicators that are measures of admissions, births, and occupancy rate to show the type of displays, backup details, and functionality that seems important to meet executive user needs for easy-to-grasp, user-controlled-hierarchy of information. These templates can be used to create other specific displays for the other indicators.

These illustrations contain the following design features:

- use of graphics to display basic information,
- analytic title of the display (e.g., some summary statement),
- time trend and cross-sectional comparisons presented for the indicator,
- benchmarks (usually the last year) provided for reference,
- details available on follow up charts, if the user wants to see them,
- printing the screen as an option at any time, and
- notes displayed that inform customers about key limitations of the data.

And, with the EIS installed, the option of toggling to e-mail directly from the screen (to inquire about the data, the follow up action, etc.) could be done.





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## 5. Implementation Plan for the Indicators

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### 5.1 Plan for Indicator System Implementation

#### 5.1.1 Phase One

1. Assign manager and staff for the implementation process.

This should require three or four persons with experience in health statistics, experience using the Access version of HIS, someone with excellent spreadsheet and graphic skills, and a physician with some appreciation of MOHP data and forms.

An issue raised earlier concerned the ability of the NICHP staff to produce and sustain this indicator production work. It is clear that they can produce data extracts and spreadsheet displays, and there does appear to be statistical estimation occurring routinely. There may be no better way to determine what can be done here than to assemble a small team and have them pull together a plan for creating an extract file and indicator views and tables. The product can be appraised by the director, and a judgement call made about needed technical support and risk of creating an expectation on the part of the minister of moving ahead.

2. Convene workgroup of MOHP technical data and health information experts.

This group would meet biweekly to advise the manager on matters of measurement and data quality. Ideally, the sectors would each be represented. While they have been accountable for the data coming into the NICHP, they may be helpful in reviewing the planned templates for data items and suggesting improvements.

3. Create indicator extract file (database) and begin to check and clean data that needs to be used to create the indicators.

#### 5.1.2 Phase Two

4. Following the designs for presentation templates and the final list of Phase One indicators, finish preparing the data and completing graphical displays and backup detail on tables for all candidate Phase One indicators for the month of January 1998 (using the year 1997 as the reference).
5. For these indicators, identify all issues of completeness, accuracy, consistency, and estimation methodology in a focused technical report, which makes recommendations for resolution of each issue (e.g., omit the indicator, make special revisions in forms for future data collection, create new approaches to estimation, write data notes on the indicator displays.)
6. The director general makes the final selection of indicators and platform for Phase One.

### **5.1.3 Phase Three**

7. Delivery of first indicator batch to the minister.
8. Prepare plan for monthly production of indicator charts and tables.
9. Indicators distributed via disk/Web site/network.

### **5.1.4 Phase Four**

10. Indicators ready for distribution.
11. Prepare plan for decision making phase.

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## 6. Future Need for Technical Assistance

The primary need at this point is to reorganize the activities of the NICHP to free up a small group of persons who can work exclusively on pulling together data from disparate forms and produce high level graphics and reports. This cannot be done by a consultant and should not be attempted. There is also a need to decide what the medium will be for delivering the indicators, a decision that has implications for other aspects of the management information systems implementation activity. These activities need local support from PHR.

This consultant may be returning to advise on the payment aspects of the Alexandria pilot, and could help review and complete final versions of the indicator “views” and the report on issues to be resolved (items 4 and 5 above). This could be done in several days (three to four days including several technical meetings on completeness/accuracy/estimation issues that will occupy the pages of item 5 and concern the decisions to be made in item 6. The consultant could also help begin the process of planning for the second phase work (item 11) based upon the lessons learned to date.

This consultant would also be available to conduct a day workshop on health policy reform indicators and their use, which might be of use to the NICHP staff or a broader audience. This sort of discussion might be of some help in getting some creative juices flowing as Phase Two thinking begins (and after a Phase One set of indicators has been established).

This consultant could also chair a working group to set up some ideas of indicators for the Montazah pilot project, as planning gets more serious. This would involve doing some policy modeling (see Annex C) to get some likely process and intermediate outcome indicators that tie to the particular interventions being planned there.



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# Annex A: Budget Tracking System Evaluation

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## On-Site Evaluation of Budget Tracking System's (BTS) Capacity to Serve As an Executive Information System (EIS)

Brad Atkinson, Abt Associates, Inc, May 27, 1998

On May 25<sup>th</sup> and May 26<sup>th</sup>, I reviewed the Budget Tracking System (BTS) as it was being installed on computers at the Ministry of Health and Population (MOHP) Headquarters. I had opportunity to review FoxPro file structures, the visual basic source code, debug one of the modules, and observe basic end-user functionality of the system.

The data presented by BTS are static data from a series of many relational data base files. There are two end-user choices to view information. End-users can choose either preset tables or charts to view data in BTS. The basic presentation of data in BTS is the table view. From this view, end-users can choose to view costs in aggregate or by functional decomposition. There are also options to view costs by source of costs. There are roughly half a dozen options available to end-users to view cost sources. The options appear to be linked to the lowest level of reporting authority/review of cost data.

In essence, the BTS data are collected on an annual basis. Efforts are apparently underway to increase the frequency of data collection for all three of the major cost elements in BTS. Each of the three major cost elements is also decomposed by what is called cost function. I was told that attempts have been made to discretely define the cost functions to identify the appropriate cost accrual to resource activity. All of the cost presentations that I saw were cross-section views of data like one would see in any cost accounting system.

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## Observations

BTS is functional cost reporting system that represents what must have been dedicated efforts by its developers. It is available immediately. It presents cost data from health care facilities across Egypt. It does so in a convenient fashion and it is easy to use. However, there are some gaps in functionality between BTS and generally accepted definitions of an Executive Information System (EIS).

An EIS is intended to convert data into information for senior managers of an organization. More than just a cliché, converting data into information involves a processing of operational data into measures that create interesting and compelling views of the performance of the organization. The defining assumption of an EIS is that it saves senior managers the time they would have spent scouring low level operational data. An EIS allows senior managers to observe at a glance the important second derivatives of the operational functions of the organization.

One of the most interesting aspects of the BTS development effort is that the team performed an initial activity-based cost exercise to identify labor resource consumption to functional activities. I

was told that their process included an initial on-site measurement of time-on-tasks and then a series of panel reviews of time-on-tasks with subject matter experts with the various facilities. This initial activity decomposition serves as the baseline distribution function for wages and salaries. The engineering staff told me that the time-on-task data would be updated as part of the cost collection process. These data may be useful in other areas of operational analysis as well as the BTS.

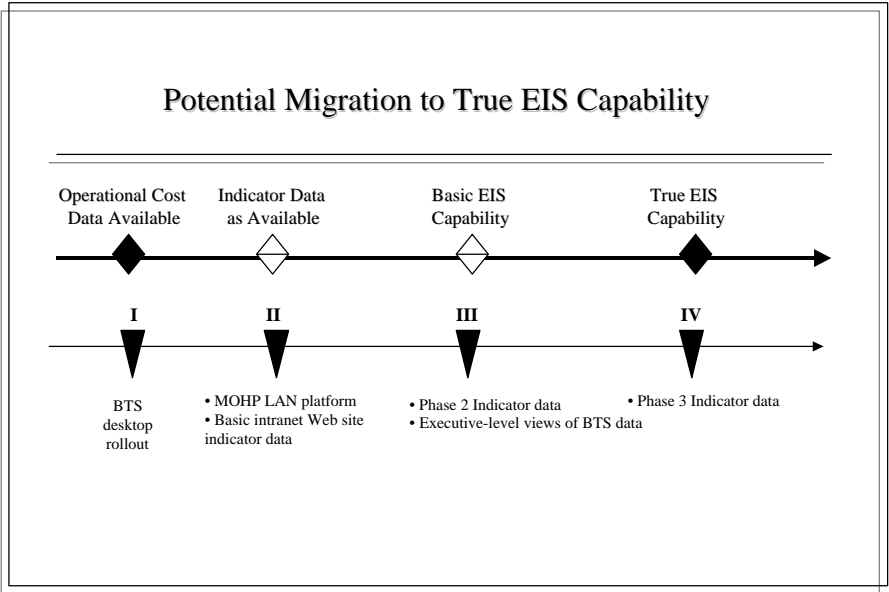
BTS is a system worthy of dissemination to managers responsible for cost performance within the health care system of Egypt. It has a basic graphical-user-interface that is adequate to navigate its functionality. In this way, BTS may be the first rollout of electronic capability for the MOHP to track operational performance. The initial rollout would be a desktop solution. Recommendations for enhancing BTS would include the following:

- migrating BTS from a FoxPro to a MS-Access data base platform;
- developing of an EIS-level views to be derived from current BTS user screens;
- developing time-series analysis capability to perform BTS trend analysis;
- developing comparative analysis to benchmarks for BTS as they become available; and
- developing standard audit processes to validate reported cost data.

The following recommendations, presented in Figure A-1, are to implement true EIS capabilities within the MOHP:

- deploy BTS as a desktop system as in its current form;
- deploy the MOHP local area network;
- develop EIS screen views for deployment as an intranet site on the LAN;
- develop Phase One indicator data;
- develop Phase Two indicator data including views of EIS-level BTS data; and
- develop Phase Three indicator data.

**Figure A-1. Potential Migration to True EIS Capability for the MOHP of Egypt**







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## **Annex B: Illustrative Monthly Indicators for the EIS**

Available in hard copy from the PHR Resource Center.



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# Annex C: Paper on Issues in Indicator Selection

Selecting appropriate indicators for program or policy interventions is difficult. The preferred indicators capture the effectiveness and/or intensiveness of the intervention or investment in some intervention. Indicators are good ones if variation in intensity and/or effectiveness of the intervention generates predictable changes in the indicator, that is, good indicators need to be sensitive and unambiguous reflections of the intervention or stimulus. Just like indicators of student performance, an indicator should be sensitive to variations in the level of performance.

This short paper describes some basic issues in indicator selection and construction and offers several frameworks that may be helpful in thinking about types of indicators that would be useful in the case of Egypt or health reforms in Egypt. The director general of the National Information Center for Health and Population (NICHHP) has responsibility for collecting data and reporting performance indicators to the minister. It will be crucial to aspire to create indicators that are of high value for decision support, and the director general will want to be able to lead the effort to continuously refine and improve the utility of the indicators, as well as lead the effort to improve the systems that communicate and deliver the indicators. In this leadership role, it will be critical for the director general to work in partnership with the health sectors on this indicator development process. This short paper and the frameworks it offers are intended as technical support for the director general as he structures his thinking about how to add value to the NICHHP indicator system and how to best structure partnerships with the sectors.

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## 1.0 Issues

Abstracting for a moment from the problems of data and resources to acquire data, there are three important issues that are encountered regularly in thinking about good indicators.

**Just Outcomes or Structure/Process Too?** Sometimes a mistake is made of believing that one (or more) carefully chosen final outcome indicators is sufficient for indicating performance of a program or policy. Obviously, there are important health objectives to be achieved by the MOHP or PHR such as improved child survival, maternal mortality, and slowed transmission rates of HIV and other STDs. These indicators of final outcomes are, of course, critically important, but they are not sufficient as formative guides to policy improvement and may be too insensitive to slow-acting reform interventions, creating the (false) impression that reform is having no impact.

There are three general problems in relying solely on such final outcome indicators to demonstrate reform success:

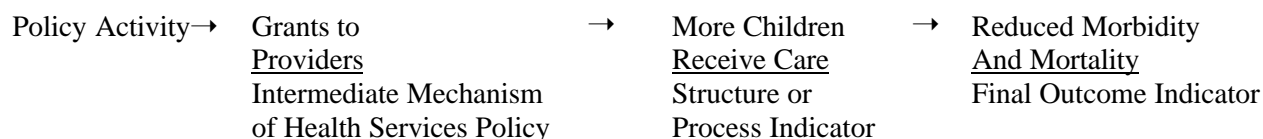
The movement (or lack of movement) in outcome indicators (such as mortality rates) may be driven by factors unrelated to reform or specific programmatic interventions, leading to ambiguous conclusions. Standardization for measurable influences on indicators (such as age and sex) can reduce, but not eliminate, this concern.

The outcome indicator may be too blunt or insensitive to reform a specific policy change or to be reasonably used as a success metric (e.g., big interventions may lead to little movement in the indicator). Hospital mortality rates, for example, may be a very blunt indicator of hospital quality.

The movements in the outcome indicator (or lack of movement) usually provide no guide to why the results are/are not occurring. So, the use of outcome indicators alone may not be able to be a formative guide to program improvement. And, day-to-day operational managers find little help in such outcome indicators for managing the quality and efficiency of the activities for which they are responsible.

For these reasons intermediate (process or structure) outcomes and associated indicators are important to use as a complement (not substitute) for outcome measures. They can often tell us more about what features of programs/policy are working and can often be gathered using readily available data from administrative record systems. Also, the use of intermediate outcome indicators can help to establish a causal chain of indicators and thereby reduce ambiguity about causality; this is particularly crucial when experimental (randomized) conditions cannot be used for evaluating impact. For example, if we have a causal chain, as below, the observation of the intermediate outcome indicator (number of children receiving services) may help to tell us how (or if) the program is working as intended, and if we are able to believe that an increase in final outcome (infant mortality rate) is a believable consequence of our policy mechanism (grants to service providers to expand capacity).

### Hypothetical Causal Chain



**Linking Indicators to Interventions.** The second issue relates to the degree of match between the indicator and the actual intervention. Most of the problems of poor indicator selection point to the problem of inadvertent rejection of significant policy effects (e.g., false negatives). One of the reasons that indicators are often not sensitive enough to program policy influences is that their selection is not done carefully enough. Not enough thought was given to the pathways with which the policy change or program would operate in order to create its final result. The process by which one determines what the intermediate measures are and what the pattern of effects across indicators might be called *policy success modeling*.

Policy success modeling is a conceptual activity aimed at understanding both the nature and sequence of results that might follow from particular policy and program intervention. It is a deliberate set of activities, possibly using some delphi or consensus process.

Using the earlier illustration of the child health grants, the mechanisms for achieving health objectives might be:

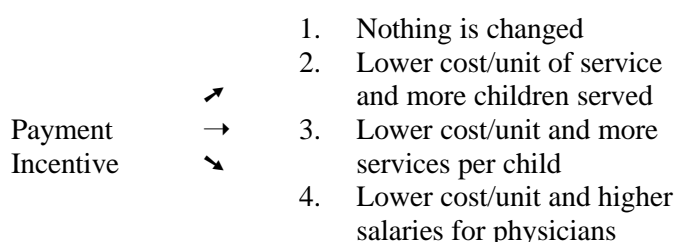
Direct service delivery programs aimed at survival and morbidity objectives;

Activities aimed at improving equitable access to appropriate services;

Activities aimed at improving the efficiency of services (so that more persons can be served for the same resource outlays); and

Activities aimed at creating a sustainable financial base for service delivery (so that access to needed services is not interrupted).

Associated with each of these pathways to improved child and material health and slower HIV and STD transmission rates are a number of possible program activities. Each activity is associated with a set of indicators that represent unambiguous evidence that some aspect of the activity is working as intended. At one extreme are final outcome indicators (did mortality fall); others are much more proximate to the policy (did resources going to providers increase) and others in the middle of the chain (did more get needed care). In general, the more proximate to policy is the indicator, the easier will be the ability to capture data. Of course most policy activities work through less simple causal chains, involving many branches. Here is where the use of intermediate indicators may help to understand where the policy is working successfully, and where it is not. For example, a program of sharp, efficiency promoting payment incentives may have several plausible routes for increasing child health (or not):



The examination of intermediate outcomes can help sort out what is happening. The main effect of the incentive is to use savings to increase incomes of physicians or to have no effect at all. However, both of these paths (#1 and #4) are unlikely to have any effect on child health in the near term. By discriminating among the paths using the intermediate indicators, the policy may be refocused or modified to achieve better results and/or avoid ineffective results.

To generalize, one of the most important characteristics of an indicator set is having some that are in proximity in the causal chain to program intervention or policy change. For any particular intervention, there would be a range of indicators, each reflecting different proximity. The kind of classifications of proximity in mind include (from close to far):

Structural and infrastructure measures that the intervention or policy is in place;

Indicators reflecting that required processes are in place to make the intervention real and complete;

Intermediate outcome measures of program and service utilization that are consistent with a well functioning program or policy intervention; and

Endpoint outcome reflecting program objectives.

**Program Evaluation and Indicators.** The third conceptual issue of indicator selection concerns expectations about the relationship between indicator monitoring and program evaluation. We might specify a set of measures, or indicators, for examining the introduction of a new system for paying hospitals based on how much care they provide (e.g., how many admissions occur). The indicators of whether the program is working might be:

Increased frequency of standard tests done a day or two days prior to surgery;

Decrease in average length of stay for patients; and

Increased numbers of re-admissions across the industry of hospitals.

By monitoring these indicators, there will be some sense about whether the program is working as intended in terms of creating the incentives, and the results of those incentives, in hospitals. So, the PHR team will be able to see whether indicator values are higher or lower and might choose to interpret those movements as indications that the program is or is not working as intended.

But, measuring program effects or impacts is a different matter altogether. Measuring program effects requires us to understand what would have happened in the absence of the intervention. The evaluation of program impacts requires measures or indicators, and also a research design which provides a basis for determining what movement in these indicators is attributable to the policy change or program intervention. This is usually done by differencing the post-intervention level of the indicator variables with the estimate of what would have happened in the absence of the program. This estimate is drawn from randomly selected controls (in a clinical trial), or a comparison group, or some baseline level of the indicator value. However done, the idea of the evaluation is to *attribute* changes in the indicator variable to the specific intervention or policy change. Yes, the pattern of changes in Average Length of Stay (ALOS), readmissions, and pre-admit tests may be indicative of expected provider behaviors in a properly functioning Diagnosis Related Group (DRG) system, but those indicators tell us, by themselves, nothing about the size of impact. For this, the evaluation needs a counterfactual estimate.

Tracking indicators of performance alone (whether process, structure, or outcome) is not sufficient for an impact evaluation. But indicators have value when used simply to monitor the trends in performance. These benefits were discussed earlier. As such, indicator tracking systems are a very loose form of evaluation technique, one that is able to describe trends, but not necessary to test hypotheses of program impact. However, indicator systems can be readily used to couple together with an evaluation design in order to make estimates of program effects.

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## 2.0 A Conceptual Framework for Health Sector Reform Indicators

Indicators for health sector reform need to link, in as sensitive a fashion as is possible, health reform initiatives and the consequences of those actions and investments. The most basic system of indicators is depicted in Figure C-1 and is composed of five dimensions that serve to define the dimensions of the design space for an indicator system:

Type of policy intervention/program/reform (privatization, payment, etc.)

Health sector (curative, public health, etc.)

Policy objective (efficiency, equity, etc.)

Population of concern (mothers, children, etc.)

Indicator type (process, outcome, etc.)

An intervention (with the modifier being the segment(s) of the health care system) is intended to create some outcome or result (on some particular population of interest). Intended results or objectives might be improved levels of quality, access, or efficiency. The results (or lack of) can be

documented at several levels: indicators of structural changes; indicators of process changes; and indicators of outcomes. Indicators need to be inextricably related to initiatives, programs, interventions, policies, and the like in order to be sensitive and to be meaningful to managers or policy makers.

The conceptual framework for health sector reform indicators is constructed from the concept above. It is represented by the flow chart shown as Figure C-1. The five dimensions to the framework are depicted as a hierarchical choice problem. They are each described in more detail. The idea of an indicator system would be to create a family of indicators for each reform intervention. The indicators would represent various mechanisms of activity and impact related to the particular reform intervention. The taxonomy suggests how to “search” for pertinent indicators by sector, by integrated objective domain, by population, and by type of indicator (proximity to intervention).

1. Health reform domain: It is important to identify the specific type of market reform activity for which the indicator is measuring implementation success and/or effectiveness. See section 3.0 below for more detail about this.

2. Health resource sector or domain: Specific reform initiatives occur within the context of one or more sectors of the health system. Examples include primary care, hospitals, retail pharmaceuticals, and the like.

3. Population segment: For each indicator, it will be necessary to specify the domain or segment of the population for whom the indicator applies. Typically, the kinds of segments that are important could include:

children

mothers

the poor

chronically ill

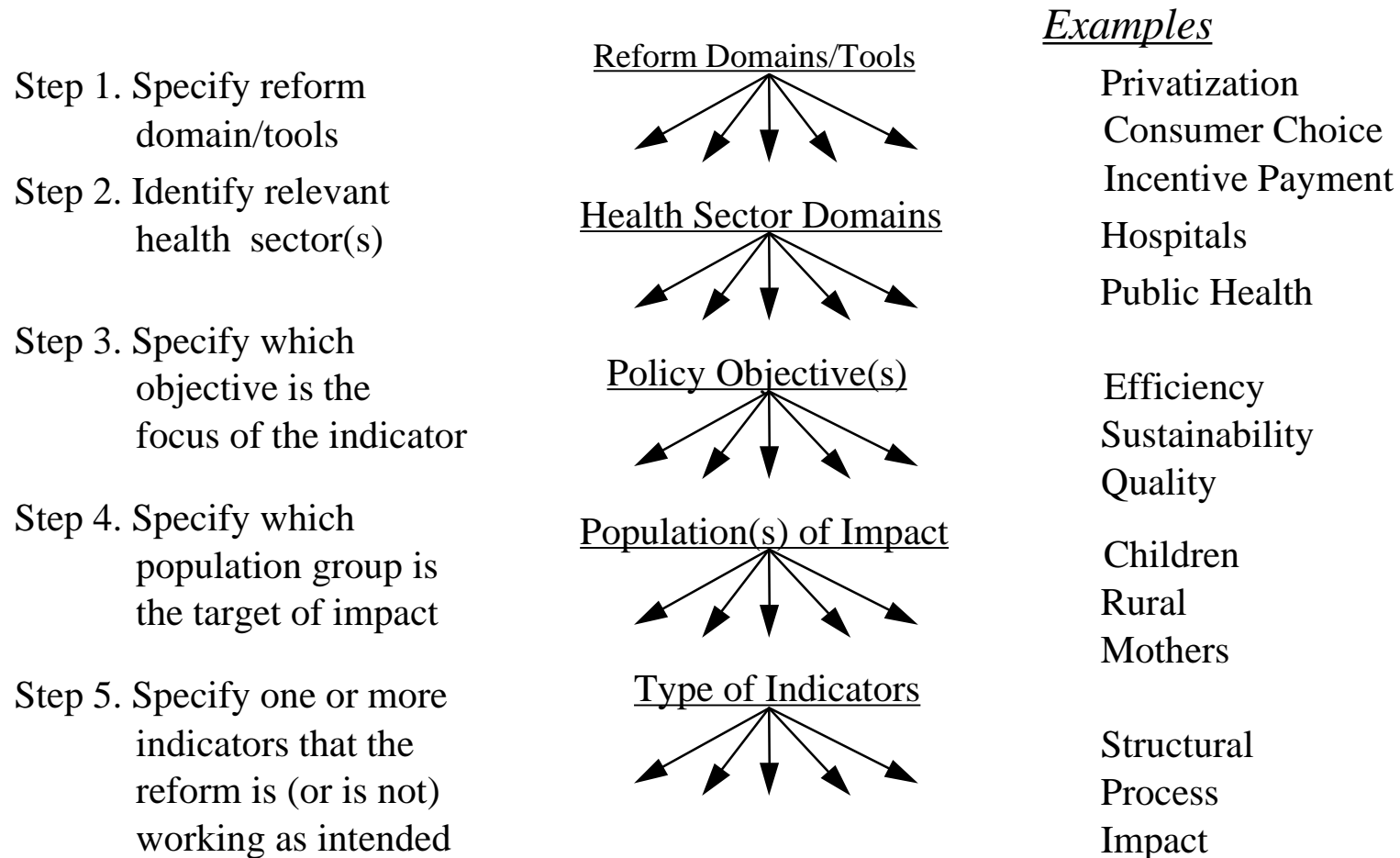
disabled

persons at risk for HIV/AIDS

the elderly

Figure C-1. Developing Indicators of Health Sector Reform

## Developing Indicators of Health Sector Reform





4. Type of indicators: A set of indicators needs to be constructed with varying levels of sensitivity to the policy, program, or intervention. The first inclination of many is to believe that the final outcome (or result) is the only true acid test of the intervention, and any other type of indicator is unreliable, incomplete, or flawed. There are two important circumstances where indicators of the "final result" type are inadequate and in need of being supplemented by other "lesser" measures. One situation is when the indicator system is intended to be used for continuous improvement by managers. Knowing that the "final result" was not obtained, managers are not necessarily able to infer what aspect of the process needs remedy, if only final outcome data are available. In this situation, a *set of indicators* would be more helpful to managers to provide guidance. Second are situations where time is of the essence. How can the manager tell if the program is working as intended if sufficient time has not elapsed for the final result to be apparent from the data? Sometimes, the use of intermediate, or process, measures can be used to identify "*if the process is working*" as intended or not. The types of indicators that might constitute a "set" would include:

**Structural indicators:** Are the structures required for the intervention in place and enforced? Structures would include legislation, regulation, operating programs, completed enrollment processes, material and supply availability, etc.

**Process measures:** These measures include indicators that the program, policy, or reform is working as intended. They are primarily measures of utilization and other indicators that behaviors have changed for providers, consumers, institutions, parliaments, or other customers.

**Satisfaction measures:** Market reforms are generally directed at improving the sensitivity of the health system to the needs of consumers or citizens; that is, shifting the locus of sovereignty from ministries and facility managers to consumers. Consequently, satisfaction is a class of indicators that may be useful as a form of outcome or result. Satisfaction indicators are difficult to specify in ways that offer reliable temporal and cross-sectional analytic value.

**Impacts:** Downstream results or outcome, such as lower administrative costs, reduced side effects, better health status, etc.

5. Intended Outcome or Result: The intended endpoints of the intervention may include the following:

Improved functional status or quality of life

Improved clinical health

Access to care and continuity of professional services

Sustainability

Improved equity

Lower costs and/or better efficiency

Together, these five dimensions of the classification system define the domain for indicators of health reform.

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### 3.0 More Details on Types of Health Sector Interventions

One dimension of the indicator framework is the specific type of health reform activity. Indicator sets need to be driven by the nature of these interventions. Interventions, initiatives, or investments in health sector development take several forms. The following list classifies interventions into four groups, focusing here only on the first.

**Health reform initiatives or activities:** Those activities that are aimed at augmenting, restructuring, or rationalizing the systems of delivery and/or financing of care.

**Public health initiatives:** Programs and activities that aim to improve health through public investments in water quality, waste handling, infectious disease control, food and drug regulations, and the like.

**Clinical care effectiveness:** Activities aimed at promoting the effectiveness of patient care.

**Economic development:** Initiatives and programs to improve the development of the health sector by means of general economic reform and economic development.

Within each of these broad domains of health sector activity and investment, there are numerous specific activities. For each specific intervention, specific indicators of performance can be developed. But those indicators need to be specific not only to the intervention, but also to the specific segment(s) of the health system, the specific segment of population for whom the result is to be measured, and the type of objective being measured (cost, access, quality, etc.).

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### 4.0 A Typology of Health Reform Interventions

Health reform is a very nonspecific and ambiguous concept. It can refer to virtually any changes in the delivery or financing of health care services. This might span the domain of policy making, financing systems, government programmatic functions, and other important changes down to the level of the provision of care itself. Philosophically, health reform may be used to label the process in one country wherein health care delivery is decentralized or privatized. And in another place health reform may refer to changes that imply centralization of delivery and/or financing.

Our concern here is developing indicators of health reform, of deliberate changes in the direction of policy as it relates to the health care systems of financing, organizing, delivering, and rationing health care resources. And, to measure the direction of reform, its depth, its intensity, as well as its outcomes we must posit some direction or objectives of the reform theory itself. This allows us to specify or model the causal linkages between the structures and processes of reform and the outcomes. These linkages allow intermediate indicators of success to be monitored to see if reform is working as intended or not. Indicators of unresolved health problems, or health system outcomes, are important measures for policymaking. To be sure, these outcomes are typically the ultimate motivation for reform: better equity and access, more efficiency, less administrative waste, better quality, better health status, higher quality of life, and maximum function. But these outcomes may result from deliberate policy activity, improved economic development, or better management within the current policy regime.

This framework focuses on indicators for the reforms related to the extent of market orientation, restructuring to achieve more market orientation, and the related outcomes. Our concern here is measuring the extent of market-orientation and tracking the changes caused or implied by policy reforms in that direction. In general, these reform concepts are consistent with the policy of

decentralization. They are also consistent with a system that is more customer oriented. And, in the end, such a theory of reform is like most others, attempting to create impacts or outcomes like minimum cost and maximum value, adequate access, sustainability, and the like. Indeed, the final outcomes or objectives do not differentiate between policies at all; all policies seem pointed at the same end results. Health reform policies generally differ in terms of the means for achieving more or less agreed upon ends.

The following framework outlines five broad areas of market reform and a number of more specific areas. These are discussed in turn. Each case illustrates some structure and process indicators. Table C-1 illustrates sets of indicators that might be used for nine examples of health reform.

## 1. Health Finance and Payment

**Health Financing Independent of Government Budgets.** A prerequisite for the formation of health care reform in many places is "privatization" of the health financing mechanism. This can be done through private insurance or through social funds established for financing health services. The issue is not whether coverage is universal or whether financing is done through the taxing authority of government. The issue is whether the funds for health care are segregated from the budgeting processes in government. Indicators here can range from whether there is legal/statutory authority, whether there are active funding organizations established, and the fraction of health care spending that is financed through sources other than operating budgets of government.

**Incentive Payment.** Independent of the approach to financing health care services the use of incentive payment programs for suppliers (doctors, physicians, hospitals, etc.) is an indication of serious concern about improving efficiency, an important and nearly universal health reform objective. Many providers are paid salaries or budget allocations (based on prior period workload). More advanced forms of compensation and payment are progressively more sophisticated including those that encourage: (1) provider efficiency, (2) providers to control volumes and intensity, (3) overall episodic efficiency, and (4) efficiency, episodic efficiency, and wellness. Important indicators may include successful demonstrations, the numbers of persons trained in the design and implementation of incentive payment methods, and the fraction of suppliers in each category whose payment is made by means other than salary or workload-based budgeting.

**Managed Care and Fundholding.** Managed care organizations bring together the concepts of an integrated network of providers, the efficiencies and quality incentives of group practice, and an array of favorable incentives for wellness and prevention of disease stemming from capitated payments. The extent, with which this form of organization is encouraged and developed, can be an important aspect of reform. Successful demonstrations, training programs, and penetration rate of enrollees in such organizations can be indicators.

**Table C-1. Illustrative Families of Indicators for Nine Health Reforms**

Reform Intervention	Health Sector	Indicator Type			Intended Objective	Target Population Segment
		Structure	Process	Impact		
1. Establish Independent Financing Fund	Finance	Law, active demos, Organization in place	% Financing through fund(s)		Quality, Access	All
2. Consumer Choice of Physician	Consumer	Law, demos, regulations	% Pop. exercising choice	Satisfaction maternal mortality	Quality, Access	Pregnant women
3. Privatization	Retail Pharmacy	Law, regulations	% Pharmacy revenues private	Satisfaction	Quality, Access, Efficiency	All
4. Incentive Payment (DRG)	Inpatient hospital	Regulations	% Hospital payment on DRGs	Cost per day	Efficiency	Urban inpatients
5. Family Practice Fundholding	Physicians, Polyclinics, Hospitals	Law to permit	% Pop. in capitated plans	Satisfaction days per 1000	Efficiency	Families w/ children, enrollees
6. Primary Care Training	Ambulatory care	In-country training program for MDs	# Physicians trained	Satisfaction % Spending on hosp	Quality, Efficiency	All
7. Data Systems & Reporting	Hospitals	Reporting system on HIV/AIDS estab.	% Municipal hospitals reporting	Homogeneity w/ % per capita on AIDS by municipality	Equity	HIV infected
8. Knowledge (Social Marketing)	Consumers	Training materials on family planning	% New mothers trained	Satisfaction w/info- Reduced birth rate	Quality	New mothers
9. Customer Accountability via User Fees	Consumers	Law that permits user fees	% Children's ambulatory care paid by consumers	Satisfaction- Utilization of ER for maternal care	Efficiency	Urban children
	Aggregate	NA	NA	Satisfaction	Quality, Access	All consumers
	Aggregate	NA	NA	% Spending private sector	Decentralization	All segments

## 2. Consumer Choice and Accountability

**Consumer Choice.** Consumer choice of provider (or fund) is a form of empowerment that can create strong and positive forces for change. In many health care systems, consumers are assigned providers, clinics, or hospitals. Offering choice to consumers (in conjunction with volume-based payment for providers) creates a strong positive incentive on service quality and access; consumers are able to vote with their feet against poor quality providers. Indicators of consumer choice might include whether or not there is a legal/statutory basis, whether there have been demonstrations of the concept, and the extent to which choice for providers and insurers have penetrated the health care economy.

**Consumer Accountability.** Most health reformers agree that the consumer's continued stake in the cost effectiveness of their care is important. Concerns abound in the United States, for example, about the perverse incentive created by corporate tax treatment of health insurance premiums, leaving everyone with the incentive to overbuy coverage and create poorer incentives for over utilization of services. Many stress the need for co-payments or customer user fees at the point of sale as an attractive feature of insurance programs. The prevalence of these types of micro and macro incentives are indicators that would be appropriate here.

## 3. Privatization and Private Practice

**Professionalism and Private Practice.** Private practice for physicians is similar to consumer choice as an essential feature of a market-oriented health care system. Without this freedom, for both doctors, groups of doctors, clinics, hospitals, and other providers, there can be no strong market forces (competition) creating incentives for offering higher quality and value. The concepts of independent practice and professionalism are symbiotic. The independent accountability for clinical and business standards is essential for private practice to work well. Here again, the indicators might relate to whether there is a statutory basis for private practice, whether there are credentialing/certification systems in place, whether professional associations are established, whether demonstrations have been successfully completed, and the extent to which private practice has penetrated each supplier category.

**Privatization.** Private interests can efficiently manage many other sectors of the health care system. These include retail and other suppliers of pharmaceuticals, medical suppliers of all types, and others. Indicators would include statutory basis, share of assets in private hands, and share of sector product privatized.

## 4. Primary Care and Health Promotion

**Primary Care.** Reversing the history of specialization to encourage primary care has been a special and widespread objective of health reformers since the first Almaty conference: promoting interest in first contact care, in family centered care, in continuity and integration, and in the other attributes of care variously associated with definitions of primary care. In many countries hospital care has historically been financed generously, directing resources away from more essential and more cost effective types of primary care services. Indicators of primary care-oriented reform might include the availability and utilization of in-country training opportunities, number of primary care practitioners, percent of health spending on hospital care, whether there is an essential drug formulary, etc.

## 5. Data and Measurement Products

**Provider Information.** Markets do not work well without information. Programs to help providers and consumers get information are essential compliments to other reforms. Provider information is needed to promote private practice, rationalization (reengineering), customer service, expanded clinical competencies, achieving licensure/accreditation standards, and the like. Professional associations often serve this sort of role, providing information to providers. For consumers, information helps set expectations about personal responsibilities and basic quality standards of professionals. Consumers also need information on where to turn for special services. Private organizations can be established to aid in this work. Information initiatives can be measured by numbers of persons reached through information outreach, and by satisfaction with knowledge products.

**Data and Measurement Systems.** Reforms cannot easily be sustained without measurement systems to support rationalization activities at all levels. Sustainable reform requires continual demonstration of progress, and achievement of results. This is probably an area where government leadership is required. One type of structural indicator would be whether or not some agency has been made accountable for developing data and measurement resources. Other indicators would include level of spending, whether there are inventories of health resource supplies available, whether there are population based data comparable in nature across geographic areas or population groups, and the like.

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# Annex D: Briefing Document

Accompanying graphics are available in hard copy from the PHR Resource Center.

## Design an Indicator System

- **Purpose:** Allow the minister and others to monthly monitor health and health care
- **Methods:**
  - review data sources and data quality
  - develop candidate measures
  - develop presentation templates
  - develop implementation plan

1

## Design Principles

- callable from computer
- monthly, with scheduled supplements
- summary visual images-w/ pointers to detail
- benchmarks and comparisons ever-present
- exception/outlier reporting where possible
- work product of NICHP staff
- get 1st issue out only when sustainability is evident

2

## Strategy for Initial Implementation

- Define <15 indicators for Phase one
- Rely on Data held/collected by NICHP
- Test Implementation ability of NICHP staff to produce indicators for January for a decision to GO/NOT GO by Mid July
- Make workgroup (w/ Sectors) to advise Director on quality issues re: demonstration
- Make decision about platform by mid July

3

## Schedule

- Phase 1
  - 1. Assign Manager and Staff for Implementation
  - 2. Convene group of MOHP technical data and health information experts
  - 3. Build extract files and begin data checking and cleaning
- Phase 2
  - 4. Finish data and complete graphical displays and backup detail on tables for Phase 1 indicators for the month of January 1998
  - 5. For these indicators, identify all issues of completeness, accuracy, sustainability
  - 6. Gen. Director makes final selection of indicators and platform for phase 1.
- Phase 3
  - 7. Delivery of first indicator batch to the Minister
  - 8. Prepare Plan for monthly production of indicator charts and tables
  - 9. Indicators for January distributed via disk/Web site/network
- Phase 4
  - 10. Indicators for February ready
  - 11. Prepare plan for phase 2

4





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